

SPECIFICATION AMENDMENTS

On page 1, insert above line 1, insert--Priority Claim

The present application claims priority on European Patent Application 03104435.7 filed 28 November 2003.--

On page 1, above line 1, insert--Field of the Invention--

Paragraph on line 1 of page 1 has been amended as follows:

-- The present invention relates to a method of removing a body of selected material from the interior of a casing extending into a borehole formed in an earth formation and : ~~The invention also relates to a drill bit for use in the method of the invention.~~--

On page 1, above line 6, insert--Background of the Invention--

On page 2, insert above line 11--Summary of the Invention--

Paragraph on line 11 of page 2 has been amended as follows:

--The present inventions include a method comprising~~The method according to the invention thereto comprises:~~

- a) lowering a drill bit for further drilling of the borehole, into the casing, the drill bit having a longitudinal axis of rotation during operation, the drill bit comprising rock cutting means, at least one protection member for protecting the inner surface of the casing from contact with the rock cutting means, each protection member being adapted to remove said selected material from the interior of the casing and being radially movable towards the inner surface of the casing, and control means for applying a radially outward force of controlled magnitude to the protection member;
- b) rotating the drill bit in the casing; and
- c) operating the control means so as to apply said radially outward force of controlled magnitude to the protection member.--

Paragraph on line 27 of page 2, ending on line 9 of page 3, has been amended as follows:

--The present inventions also include~~In another aspect of the invention there is provided a drill bit for drilling a borehole into an earth formation, the drill bit being adapted~~

to remove a body of selected material from the interior of a casing extending into the borehole, whereby during operation the drill bit has a longitudinal axis of rotation, the drill bit comprising rock cutting means, at least one protection member for protecting the inner surface of the casing from contact with the rock cutting means, each protection member being adapted to remove said selected material from the interior of the casing and being radially movable towards the inner surface of the casing, and control means for applying a radially outward force of controlled magnitude to the protection member.--

On page 3, delete lines 10-31.

On page 4, delete lines 1-29.

On page 4, above line 30, insert--Brief Description of the Drawings--

Paragraph on line 30 of page 4, ending on line 19, has been amended as follows:

--Some embodiments of the The invention will be described hereinafter in more detail and by way of example with reference to the accompanying drawings in which:

Fig. 1 schematically shows a drill bit for use in the method of the invention;

Fig. 2 schematically shows a reamer arm of the drill bit;

Fig. 3 schematically shows a first alternative reamer arm for use in the drill bit;

Fig. 4 schematically shows a second alternative reamer arm for use in the drill bit; and

Figs. 5a-5d show various possible arrangements of rock cutters and protection members on the reamer arm;

Fig. 6 schematically shows the drill bit of Fig. 1 lowered in a casing during an initial stage of cleaning the interior of the casing;

Fig. 7 schematically shows the drill bit during a further stage of cleaning the interior of the casing;

Fig. 8 schematically shows the drill bit during a yet further stage of cleaning the interior of the casing; and

Fig. 9 schematically shows the lower end of the casing after being connected to a further casing.--

On page 54, above line 20, insert--Detailed Description of the Invention--

Paragraph on line 22 of page 6, ending on line 9 of page 7, has been amended as follows:

--Furthermore, the protection member 12 is sufficiently wear-resistant to effectively clean the casing from undesired remains such as cement, but is of a significantly lower hardness than the rock cutters 10. In this manner it is achieved that the protection member 12 quickly wears away during further drilling of the borehole with the drill bit 1 in order that the protection member 12 does not hamper such further drilling. Suitably the protection member 12 is may be made of tungsten-carbide or hardened and/or heat-treated steel. These materials are sufficiently wear resistant to provide the desired standoff and protection of the casing, but vanish quickly during drilling into the rock formation. The degree of wear-resistance of tungsten-carbide can be adapted to circumstances by modifying the amount of cobalt in the alloy and/or by modifying the particle size distribution of the alloy material. ~~An advantage of using steel for the protection member is the ability to machine the protection member as an integral part of the reamer arm--~~

On page 7, insert above line 22 the following paragraphs:

--The protection member prevents contact between the rock cutting means and the inner surface of the casing, and further that the protection member does not cause any damage to the inner surface of the casing by virtue of the protection member being moved radially outward at a controlled force. Thus the protection member removes the undesired material from the interior of the casing in a safe manner.

Suitably the drill bit comprises a bit body and a reamer arm movable in radial direction relative to the axis of rotation, wherein the rock cutting means and each protection member are provided at the reamer arm, and wherein step c) comprises operating the control means so as to move the reamer arm in radially outward direction relative to the axis of rotation.

By radially extending the reamer arm, the protection member scrapes against the inside wall of the casing thereby cleaning the casing without the risk of the rock cutters damaging the casing.

Preferably the control means includes a pump for pumping drilling fluid to the drill bit, and wherein step c) comprises operating the pump so as to pump drilling fluid at a controlled flow rate to the drill bit.

In order to gradually remove the undesired material from the interior of the casing, suitably the drill bit is axially moved through the casing simultaneously with steps b) and c).--

Paragraph on line 22 of page 7 has been amended as follows:

--In Fig. 3 another ~~is shown a first alternative~~ embodiment of the reamer arm 8 is shown, whereby the reamer arm 8 is additionally provided with a permanent gauge-protecting area 14a of a hard material.

Paragraph on line 26 of page 7, ending on line 4 of page 8, has been amended as follows:

--In Fig. 4 another ~~is shown a second alternative~~ embodiment of the reamer arm 8 is shown, wherein the protection member 12 is arranged on top of the gauge-protecting area 14a. This arrangement has the advantage that the reamer arm 8 can be of a relatively small cross-sectional dimension. Suitably the gauge-protecting area 14a is integrally formed with the protection member 12, and is formed as a layered structure. As shown in the Figures, the outer surface of the protection member 12 has a positive exposure in radial and axial upward direction relative to the rock cutters 10 and the gauge protection.--

On page 9, above line 11, insert the following paragraphs:

-- In an another embodiment the drill bit is first operated to drill a longitudinal bore in said body of selected material thereby forming an annular remainder portion of the body of selected material, and subsequently the drill bit is operated to remove the annular remainder portion whereby the drill bit is axially moved through said longitudinal bore.

It is preferred that the protection member suddenly or gradually wears away when the drill bit is operated to further drill the borehole so that the borehole can be drilled with its nominal drilling diameter as dictated by the rock cutting means without being obstructed by the protection member.

In an another embodiment, the protection member is sacrificial when it contacts the subterranean formation. This can be achieved for instance by providing the protection member with a material having a balanced wear resistance that is on one hand sufficiently wear resistant to prevent the rock cutting means to contact the casing inner surface and on the other hand wearable against the subterranean formation once the drill bit is outside the casing and drills the formation.--

Paragraph on line 6 of page 11 has been amended as follows:

~~--An advantage of the alternative mode of operation over the normal mode of operation described with reference to Figs. 6-8, relates to the potential risk of damage to the transition section of the casing between the bell section and the remainder casing section during the normal mode of operation.~~ During the normal mode of operation, the The transition section between the bell section and the remainder casing section converges to a smaller diameter in upward direction. Such damage can be caused by the protection members as these move from the bell section into the remainder casing section if the protection members have somewhat sharp edges due to minor wear of the protection members during cleaning of the bell section.--

On page 12, above line 1, insert --We claim:--